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ABSTRACT

Funded in 1999, the "Learning by Doing" (LBD) program of the Minnesota State Colleges and Universities system Center for Teaching and Learning was designed to increase faculty knowledge, skills, and confidence in using active learning strategies. This report marks the end of an in-depth evaluation study of active learning and the effects of LBD on two populations of full-time faculty, those who were randomly selected form the population at large and those who applied for and received an LBD learning grant. The study was conducted by an external evaluation team, and the methodology was observational rather than experimental. Nearly 1,000 faculty members at large and 83 faculty grantees completed a faculty survey abut LBD. More than 3,400 students from classrooms of faculty at large and grantees completed 1 of 3 annual waves of the student survey. The study found that the LBD faculty development program helped develop a cadre of motivated faculty and demonstrated that greater use of active learning teaching strategies can increase student effort and involvement with learning. Implications for the development of the program are than future faculty development efforts should focus on peer advocates, team grants, and other strategies at the campus level, with training and support from the system-wide Center for Teaching and Learning. An appendix contains a summary of significant differences between grantees and faculty at large on the student survey forms. (SLD)

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ED 474 483

FINAL REPORT SUMMARY

Evaluation of the "Learning By Doing" Faculty Development Program

Conducted by

by

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For the Minnesota State Colleges and Universities (MnSCU)
Center for Teaching and Learning

September, 2002

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FINAL REPORT SUMMARY

Evaluation of the Minnesota State Colleges and Universities "Learning By Doing" Faculty Development Program

Active learning is . . .

> *"Providing an environment and creating a method that allows students to test or exercise the ideas to which they are being exposed."*
>
> *"When learning is more than memorization; it is relating new knowledge to existing knowledge and sharing this understanding with others."*
>
> *"Reality based; working on real problems to help real people."*
>
> *"When students participate with hands-on activities that elicit critical thinking skills and reinforce real-life experiences."*
>
> *"It is redundant. If the student is not actively participating, learning does not take place. Active learning* means *learning."*

These are just some of the ways that faculty members defined the central concept that served as the focus of a three-year faculty development effort by the Minnesota State Colleges and Universities' system Center for Teaching and Learning. Funded in 1999 with a 1.6 million dollar grant from the Bush Foundation, the "Learning By Doing" (LBD) program was designed to increase faculty knowledge, skills, and confidence in using active learning teaching strategies. The intent also was to increase faculty participation in campus-based and system-wide faculty development activities designed to enhance teaching and learning. Last but not least, the LBD program hoped that greater use of active learning teaching techniques by faculty would lead to increased student satisfaction and involvement in their own learning.

Learning By Doing Program Activities

In 1999, the LBD grant was the largest grant the Bush Foundation had made to a single educational system; it had followed on the heels of planning grants that Bush had awarded during 1996-98. This investment was matched internally with annual

contributions of up to $200,000 from the Office of the Chancellor in support of the LBD program. Over one million dollars of the implementation grant was passed on to MnSCU campuses between 2000 and 2002 in the form of teaching grants to individual faculty members, faculty teams, and institutions, in amounts ranging from $1,000 to $25,000.

Between fall of 1999 and spring of 2002, the LBD program was guided by Center for Teaching and Learning (CTL) staff members and a 12-member advisory committee comprised of MnSCU faculty, administrators, and other higher education professionals. In addition to administering two rounds of teaching grants to 150 recipients, the CTL provided summer conferences, traveling workshops, training for campus leaders, educational resources, and technical assistance to help faculty integrate active learning strategies and instructional technology into their courses. A website was developed to serve as a clearing house of information about teaching and learning. By spring of 2002, over 800 faculty members had participated in a LBD conference or workshop.

The Evaluation

This report marks the end of an in-depth evaluation study of active learning and the effects of LBD on two populations of full-time faculty: faculty who were randomly selected from the population at large, and faculty who applied for and received a LBD teaching grant. The $193,739 study was conducted by an external evaluation team that was contracted by MnSCU in 1999 as part of their Bush Foundation proposal.[1]

In the broadest sense, the LBD evaluation sought to understand "what difference" faculty development made on faculty members' teaching practices and attitudes. The evaluation also focused on students' perceptions: how much active learning did they observe in classrooms? How did they feel about the teaching methods used in the course? What effects did those teaching methods have on them? Underlying the LBD program was the assumption that active learning was a proven teaching approach that would increase

[1] Previous interim reports describing the study, as well as the full technical report, are available from the principal author. Excerpts and individual reports for subsystems within MnSCU are available from the CTL website (www.ctl.mnscu.edu).

student involvement and learning. The testing of this assumption became an important by-product of the evaluation.

Background

"Active learning" was defined broadly by LBD program staff as "anything that involves students doing something and thinking about what they are doing."[2] Rather than advocate a particular form of active learning (such as collaborative learning, service learning, writing, or technology-assisted strategies), the LBD staff took the position that faculty should use whatever strategies best suited their discipline and teaching style in order to promote meaningful student engagement. While 42 discrete teaching strategies in eight categories were eventually delineated by the evaluation team, faculty members were not expected to use all of the strategies, all of the time. Rather, it was hoped that faculty would feel proficient in a wide array of strategies, and use the most appropriate strategy with confidence, when particular learning objectives called for it.

While diversity of use was expected, it was hoped that more faculty would use more of these teaching strategies, more often, as a result of the LBD program. It was also expected that students would observe more of these techniques in grantees' classrooms, compared to classes taught by faculty at large; and that greater use of active learning by either grantees or faculty at large would lead to more positive student involvement.

Methodology

The methodology used to evaluate LBD was observational, rather than experimental. The evaluation team could not randomly award faculty a LBD teaching grant, nor randomly assign students to LBD grantee classrooms. What the evaluation team did have was access to typical faculty members and their students, as well as grantees' and their students. The study design capitalized on naturally occurring variations in teaching

[2] Bonwell, C., and J. Eison (1991). Active Learning: Creating Excitement in the Classroom, ASHE-ERIC Higher Education Report, No. 1.

practices among the faculty at large in 2000 to create two subgroups: "More" and "Less Frequent" users of active learning. The evaluation used several sets of comparisons between these "More" and "Less Frequent" subgroups, and between the average faculty member at large and grantees, to address key evaluation questions.

Two principal tools—a four-page Faculty Survey and a two-page Student Survey—were developed. The surveys were built in parallel: faculty members were asked to report their use of the 42 active learning teaching strategies, students were asked to report their observation of a similar list of active learning activities in class.[3] Additional items in both surveys were developed to capture demographic and other variables. Respondents to the Faculty Survey were asked about their satisfaction with teaching, their perceptions of active learning, confidence in engaging students, and participation in faculty development activities. They were also asked to define *active learning* in the survey's sole open-ended question. Additional items in the Student Survey asked respondents about their satisfaction with the teaching methods used in the course, their attitudes and behaviors during class, hours spent outside of class studying, class attendance, and other outcomes.[4]

These two surveys were administered to a random sample of faculty at large and students in their classrooms, and to all lead faculty with LBD grants and their students. Nearly 1,000 faculty members at large and 83 faculty grantees completed the Faculty Survey. Over 3,400 students from both faculty at large and grantee classrooms completed one of three annual waves of the Student Survey. [5]

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[3] Active learning strategies were grouped into eight thematic categories: Lecture, Discussion, Writing, Technology-Assisted, Interactive, Collaborative Learning, Assessment, and Experiential. Items comprising these scales in the Faculty Survey and Student Survey were found to have moderate to strong reliability.

[4] Several items were drawn from the National Survey of Student Engagement. The NSSE is a product of the National Center for Higher Education Management Systems and the Indiana University Center for Postsecondary Research and Planning, with support from the Pew Charitable Trusts. The NSSE is a 4-page machine scored instrument covered college activities, the college environment, student estimated "gains," and opinions about their institution.

[5] Response rates to the Faculty Survey for faculty at large were 55% (2000) and 43% (2002); for faculty grantees it was 86% (2001) and 61% (2002). Participation by faculty at large in the Student Survey fell significantly over the 3 years, from n = 66 (100%) in 2000 to n = 35 (53%) in 2002. Participation by faculty grantees in the Student Survey ranged from 42% to 63%.

Key Findings for Faculty at Large[6]

- ***Use of active learning teaching strategies was fairly high at baseline.***
  The baseline usage of active learning teaching methods turned out to be rather high.[7] Faculty at large reported using a fairly high number of strategies (about 20 out of 42, on average). Even faculty who were grouped into the "Less Frequent" subgroup reported using an average of 15 strategies "sometimes," if not "frequently." The validity of faculty members' self reports was supported by student observations in a subset of classrooms.[8]

- ***Short-term, less innovative strategies were most common.***
  The typical faculty member favored eight, fairly traditional active learning strategies, such as basic student assessment[9] and other short-term strategies that could be embedded in a lecture or discussion course. About half of the 42 strategies listed were never or rarely used. Additionally, the repertoire of methods was more limited for some faculty members than others. Greatest use of active learning strategies was occurring in the technical colleges, in humanities courses, and by mid-career faculty. Active learning strategies were least used by faculty in the early or late part of their careers, by those in state universities, and by science faculty.

- ***Faculty agreed on the meaning of active learning, broadly defined.***
  Faculty agreed on a broad definition of the term, with a large majority using phrases that echoed those being promoted by the LBD staff ("active vs. passive participation in learning"), or the name of the initiative itself ("learning by doing"). These definitions were "correct," but sometimes limited. The better definitions stressed the underlying cognitive engagement of students in *thinking* about what they were doing—they did not just equate active learning with "doing something," or a

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[6] See the Appendix for complete list of study questions and results.
[7] These results are based on a 56% response rate to the Faculty Survey in 2000 (n = 555).
[8] The average correlation between 42 items measuring active learning on the Faculty Survey, and 32 items measuring the same strategies on the Student Survey, was $r = .45$ ($sd = .10$).

particular pedagogical technique. Only about one-quarter of the faculty who supplied a written definition referenced cognitive processes or outcomes. Similarly, the better definitions stressed some fundamental shift in teacher and student roles, with the student assuming more responsibility. Such a shift in roles reflects the important shift in focus from *instruction* to *learning*. Yet only about one-quarter of the definitions referenced changes in teacher or student roles.

- ***Support for active learning teaching strategies was generally strong.*** Satisfaction with active learning methods ran high among faculty at large, as did interest in learning more about every category of active learning except for writing. On average, faculty were fairly confident about their ability to engage students in learning. The doubts faculty expressed—such as whether active learning strategies work best with only certain subjects, or only in small classes—were fairly common ones.[10] Only a small proportion of faculty wrote in answers to the open-ended question that expressed underlying skepticism, or outright disregard for the concept.

- ***Little change in teaching practices and attitudes occurred for faculty at large.*** The evidence suggests that the LBD program made little impact on faculty at large. Few differences were found when the reported teaching practices, attitudes, and definitions of randomly surveyed faculty were compared in 2000 and in 2002. One positive change was in technology. In 2002, faculty reported using five technology strategies more often than faculty in 2000. However, the increased use may not be due entirely to the LBD program. Strategies such as having students use the internet for research, or using e-mail to promote communication, could have resulted from the efforts of the MnSCU Office of Instructional Technology, or from the general growth in technology literacy among faculty and students during that time.

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[9] The three most frequently used strategies, out of all 42 listed, were: "instructor gives individual student feedback," "instructor uses student feedback during a lecture to guide the session," and "students supply written feedback on the course to the instructor."

[10] This latter doubt may even have some validity. In one analysis from this study, smaller class size correlated with student reports of working harder than they thought to meet teacher's expectations, receiving helpful feedback from the teacher, and feeling actively engaged.

Somewhat more attributable to the LBD program were the small, but statistically significant increases in collaborative learning groups lasting several weeks or more, and in "service learning (community service + academic study)." Both of these strategies represent large-scale format changes that faculty are not likely to adopt for every course. And unlike other strategies, they cannot be used repeatedly within class periods. This reduces the likelihood of faculty checking "frequently" for either long-term collaborative learning or service learning items. Thus, the increased use of these strategies from 2000 to 2002 is all the more remarkable and encouraging.

Overall, however, the teaching profile reported by faculty in 2002 looked very similar to the one that emerged in 2000. The same "most frequently used" strategies that emerged at the beginning of the initiative were most used at the end; those in the middle range of use were still in the middle; and with few exceptions, those in the never or rarely used category remained so. The conclusion that the LBD had little generalized effect on faculty at large was strengthened when the students' observations of teaching over the three-year period were reviewed. The mean trends lines in student reported use of active learning did not rise or fall appreciably for either the "More Frequent" or "Less Frequent" faculty subgroups over time, for any category of active learning.

- ***Participation in faculty development by faculty at large increased significantly.*** Although the goal of increasing the use of active learning strategies for faculty at large was not reached, an important secondary goal of the LBD program was reached. And that was to increase faculty members' participation in faculty development at both the campus and system-wide levels. Several statistically significant and meaningful increases were found. In 2002, almost half of the faculty (49%) reported having attended a campus event, up from 42% in 2000. Similarly, reported attendance at system-wide events increased from 23% to 29%. Fewer faculty in 2002 (36%) than in 2000 (44%) said they were "familiar with the system-wide CTL, but haven't been involved since the merger in 1995." Use of materials distributed by the system-wide CTL increased significantly during this period as well.

- ***Greater participation in faculty development was associated with greater use of active learning methods.***

  More important was the finding that higher participation in faculty development activities was significantly correlated with greater use of active learning strategies, as reported by faculty at large in 2002. Especially noteworthy was the contribution of campus-based faculty development activities. Even after taking into account favorable attitudes towards active learning and other factors, the evaluation team found that participation in campus-based faculty development helped predict higher use of active learning for virtually all categories of active learning, except for interactive and experiential learning strategies. (Greater involvement with *system-wide* faculty development was significantly related to experiential learning.) For technology-assisted strategies, campus-based faculty development was the *only* significant predictor of higher use.

- ***"More Frequent" active learning classrooms had higher levels of student involvement and effort.***

  Strong support for the premise that active learning leads to more positive student involvement comes from the first-year comparison of "More" and "Less Frequent" classrooms of faculty at large. In 2000, students in "More Frequent" classrooms reported spending about a half hour more per week preparing for class than students in "Less Frequent" classrooms (m = 4.10 vs. 3.60). They also reported more positive behaviors and feelings on six of the nine items measuring positive involvement: 1) "ask questions in class," 2) "rewrite papers / redo assignments," 3) "work harder than they thought they could to meet the teacher's expectations," 4) "reflect on what they were learning in the course," 5) "receive helpful feedback from the teacher," and 6) "meet with other students outside of class"). Further, enrollment in a "More Frequent" classroom helped to predict these six indices of positive involvement, even when for students' age (and other student characteristics), faculty members' teaching experience, and class size were held constant. These findings suggest that while student, faculty, and course characteristics all play a role in engaging students, the use of active learning strategies also helps.

Key Findings for Faculty Grantees

- ***The LBD grants reached a cadre of motivated, often younger faculty.***
  Over half of the grantees had taught for 10 years or less, and one-third of 2002 grantees were in their first five years of teaching. This was distinctly different than the age distribution of faculty at large who responded to the Faculty Survey, and contrary to the finding that mid-career faculty members were the most frequent users of active learning. That the LBD grant program reached young faculty and helped them enhance their teaching skills early in their career is a positive finding.

- ***Grantees were not necessarily the most experienced users of active learning.***
  On the Faculty Survey, first- and second-round grantees together reported using more discussion, technology, collaborative learning, and experiential learning strategies than the average faculty member at large. However, when first-round grantees were compared with the More and Less Frequent subgroups of faculty at large, grantees were often found to be "in the middle" in terms of usage—i.e., not as experienced in some teaching methods as the More Frequent faculty members, but more experienced than the Less Frequent faculty members. Given that grantees were younger in the careers, perhaps this finding makes sense.

  The amount of active learning witnessed by students in grantee classrooms only partially supported grantees' self-reported use of these strategies. In 2001-02, students in grantees' courses observed more technology strategies than did the students in classrooms taught by faculty at large, but no other category of active learning was observed to be significantly more or less in grantee classes. Similarly, in 2002-03, students in grantees' classrooms observed more interactive and collaborative learning strategies taking place; but again, all remaining categories of active learning were similar. The lack of a stronger difference may reflect the fact that average use, among faculty at large, was fairly high at baseline. Even so, it appears that the grants increased the amount of technology, interactive, and collaborative learning strategies being used.

- ***LBD grants led to increased student involvement and effort.***
  Strongest support for the premise that the LBD itself made a difference comes from the results of the first round of grantees' classrooms. Students in 2000-01 grantee classes spent about one hour more per week outside of class preparing for the course than students in classrooms taught by faculty at large (m = 4.62 vs. 3.61). They were also significantly more likely to say they had:

  - rewritten a paper, redone an assignment several times
  - worked on class assignments with other students outside of class
  - worked harder than they thought they could to meet the teacher's expectations
  - discussed ideas from their reading or class with the teacher outside of class
  - felt motivated by other students in the class
  - worked harder in this course, compared to most others

  They were also significantly *less* likely to report examples of disengagement, such as feeling bored or falling asleep during class, missing class on purpose or "by mistake." Significantly fewer of them reported missing any class, as well.

Limitations of Active Learning Teaching Methods

Not all of the expectations of active learning were fulfilled. In classrooms taught by faculty at large, students were no more satisfied with the teaching methods used in "More Frequent" than in "Less Frequent" courses. Neither was student satisfaction higher in grantee classes. In fact, in first-round grantees' classes, students were significantly *less* satisfied than those in classrooms taught by faculty at large.[11] Perhaps their level of satisfaction was dampened by the fact they were working so much harder.

None of the remaining items in the Student Survey addressing global outcomes and experiences were associated with "More Frequent" active learning classrooms, and only a

[11] Students were still satisfied on the whole, however. Their mean level of satisfaction was 3.25, on a scale in which 3.0 meant "somewhat satisfied" and 4.0 meant "very satisfied."

few were found to vary significantly between faculty at large and grantee classrooms. It is disappointing that students in "More Frequent" and grantee classrooms did not consistently report more favorably on items such as: "I learned a lot in this course," or "I felt the class was more relevant to their life, helped me grow as a person." These are all desired, expected outcomes of active learning.

Implications for Future Work

There are several important implications of this evaluation study for the future. Some of the implications are technical, others are programmatic in nature.

Technical Implications

- ***Active learning can be defined and studied.***
  The success of the evaluation tools in measuring use of active learning strategies from both the faculty and student perspectives enables us to study future waves of faculty development initiatives. The substantial correlation ($r = .45$) between faculty self-reported use and student observations of use provides some confidence, when using either faculty or student perceptions, that they have some basis in a common reality.

  Results of the Faculty Survey have provided us with a norm for typical practice, with upper and lower ranges for what can be considered more and less frequent use of active learning strategies. As a result of the repeated surveys, we have learned something about the stability of this norm over time. This norm now provides us with a standard of comparison, something that had been lacking when this evaluation began. Additionally, with respect to comparable norms for the Student Survey, the first report of the National Survey of Student Engagement (NSSE) study is scheduled for release in November of 2002. We will be able to compare MnSCU results on selected items measuring positive involvement and disengagement with results from similar institutions for the same or very similar items from the NSSE.

- ***Longitudinal cohorts need incentives.***

  We have also learned something about the difficulty of keep a faculty cohort intact over multiple years without a more tangible incentive. Our "More" and "Less Frequent" subgroups were created from an unsuspecting group of volunteers who innocently filled out the Faculty Survey. Attrition in these subgroups was substantial—we lost almost half of the participants from the first to third year. Those who dropped out represented some of the most and least frequent users of active learning. That left behind a group of continuously participating faculty who were (in students' estimation) closer to the average on the scale of usage to begin with. Studying the students' observations over time among this latter group of faculty did help us understand, and confirm the lack of an LBD program effect on average active learning users. But the attrition prohibited us from understanding more clearly what effect the initiative may have had on faculty who were either furthest ahead, or furthest behind the curve.

- ***Pedagogical effects are real, but they are small.***

  Several factors make it difficult to detect the effect of active learning—or any pedagogy—on students. In this study, we learned that use of some form of active learning was common among faculty at large at baseline. The typical faculty member used 20 of 42 strategies, and even the "Less Frequent" users endorsed about 15 strategies. This meant our study became a comparison of treatment dosages, rather than the presence vs. absence of a treatment. Because the margin between "More" and "Less Frequent" users was not huge, the differential effect of active learning strategies on student outcomes was reduced.

  Added to this, 94% of the students surveyed in the first year were either somewhat or very satisfied with their course instruction; 80% agreed somewhat or strongly that they "felt engaged in learning;" and 87% agreed somewhat or strongly that they "learned a lot in the course." It's a challenge to find program impacts when reported outcomes are high among the general population. Indeed, most of the statistically

significant, positive differences in student means were modest to small in magnitude, generally running about .20 to .40 on a four-point scale.

The study also showed the strong influence of student age and other variables on indices of student engagement. The strongest single correlate with positive involvement was students' age: the older the student, the more likely he or she engaged in meaningful ways with the course. When age and other factors were entered into the statistical model for predicting "feel actively engaged," the multiple correlation was small ($R = .261$), leaving a lot unexplained about students' feelings of engagement. The reminder that many variables influence student effort and involvement besides teaching technique does not negate the importance of active learning strategies, or the overall study. It only helps to set appropriate expectations for initiatives devoted to improving student learning.

Programmatic Implications

- ***Active learning teaching strategies can make a difference and should be promoted.*** Using more active learning strategies was associated with better student outcomes. This general finding was supported by comparisons of "More" and "Less Frequent" faculty classrooms from the population at large, as well as by data from two rounds of grantee courses. In "More Frequent" classrooms, students studied about one-half hour more per week than students in "Less Frequent" classroom. In first-round grantee classrooms, students studied almost an hour more per week than students in classrooms taught by faculty at large.

  Additionally, 10 student behaviors and attitudes were found to be more positive in first-round grantees' classrooms than in classrooms taught by faculty at large, and four similar outcomes in second-round grantees' classrooms (see Appendix, Table 1). Fewer missed classes, fewer instances of students feeling bored or sleeping in class, more students who are working harder—all represent outcomes that make teaching more rewarding for faculty. Rewriting papers, working on assignments and

discussing ideas outside of class, and spending more time studying represent outcomes that lead to higher learning and stronger social integration and student retention.

- ***Active learning remains a viable and needed focus of faculty development.*** Faculty development in this area is still needed. While the average number of strategies reported by faculty was fairly high at baseline, only eight strategies were used "sometimes" or "frequently," and half the strategies were rarely or never used. The most common strategies were also the most traditional, and this pattern did not change over time. In addition to continuing need, there is also evidence of continuing interest in active learning. Faculty respondents wanted to learn more about almost every category of active learning strategies listed in the survey. This was as true in 2002 as it was in 2000. Finally, participation in faculty development activities sponsored by both the campus and system CTL increased over the years, further indicating desire for instructional improvement support.

- ***Grants are an effective faculty development strategy.*** The LBD grants helped 150 faculty design new courses or refresh old ones, collaborate in new and different ways with others, and increase the amount of active learning in their classrooms. After two rounds of grants, MnSCU now has an additional cadre of experienced faculty who can help promote these techniques. As described above, there is evidence from this study that investing in faculty development leads to more positive engagement by students.

- ***Individual faculty-focused professional development may be limited.*** While the effectiveness of grants for the grantees and their students is supported by this evaluation, it is not clear that grants to individuals have any carry-over effects on the larger department, school, or institution. MnSCU is a large educational system with approximately 118,000 students and 5,100 full-time, and 8,000 part-time faculty members. Maintaining a high standard of practice among the faculty body as a whole is a challenge. Program staff members' internal review of the LBD led them to

conclude that the more successful grants were more often led by faculty teams than by individuals. The more successful grants also had identified community needs, were integrated within existing academic processes, had a higher degree of local relevance, and overlapped with other change initiatives. This suggests that success of faculty-focused professional development also depends on strategic interplay with the campus environment.

- ***Using peers as advocates or consultants at the campus level appears to be a promising strategy.***

  Information from the Faculty Survey in both 2000 and 2002 indicated that faculty felt that release time and peer mentoring were the two most important types of support that could be offered to help them enhance their active learning teaching skills, followed by sabbaticals and "greater administrative support for the existing Centers for Teaching and Learning on campus." This latter suggestion was endorsed by 83% of the respondents in 2000, and by 79% in 2002. Results of this evaluation add other support for focusing on campus-level faculty development. Namely, greater participation in faculty development at the campus level was associated with higher use of six categories of active learning.

Conclusion

This study found that the Learning By Doing faculty development program helped develop a cadre of motivated faculty, and demonstrated that greater use of active learning teaching strategies can increase student effort and involvement with learning. Programmatic implications are that future faculty development efforts should focus on peer advocates, team grants, and other strategies at the campus level, with training and support from the system-wide Center for Teaching and Learning. Future studies can build on this evaluation to examine broader effects of active learning on student retention in school and academic performance, and on the campus climate for teaching and learning.

Appendix A

Table 1
Summary of Significant Differences between Grantees and Faculty at Large on Student Survey Items

Student Outcomes	2001 Grantees vs. Faculty at Large	2002 Grantees vs. Faculty at Large
Satisfaction (4.0 = "very satisfied")	↓ *means* = 3.25 vs. 3.49 Students in grantee classes were less satisfied	*Not significantly different*
Missed Classes (% saying "few or none")	83% vs. 75% ↑ More grantee students missed few or no classes	85% vs. 77% ↑ More grantee students missed few or no classes
Student Involvement	↑ Rewrite paper, redo assignments ↑ Work on class assignments outside of class ↑ Discuss ideas, reading, outside of class with other students ↑ Work harder than thought to meet teacher's expectation ↓ Feel bored or sleep during class ↓ Miss class on purpose or by mistake ↑ Feel motivated by other students	↑ Work on class assignments outside of class ↑ Discuss ideas, reading outside of class with other students ↑ Feel motivated by other students
Hours per Week Spent Studying	↑ *means* = 4.62 vs. 3.61	*Not significant* (3.81 vs. 3.82)
Other Outcomes	↑ Worked harder in this course compared to others ↓ Teacher explained why activities were important	↑ Not understanding goal of course or what supposed to learn ↑ Teacher asked what learning, what getting out of course

Evaluation of the MnSCU Learning By Doing Faculty Development Program
Answers to Fifteen Guiding Evaluation Questions

Teaching Profiles at Baseline (Spring 2000)	
Question	**Findings**
1. How did faculty define AL? Was there a shared understanding of the term? How did faculty members' understand of AL vary across the subsystems?	• 405 (73%) Faculty Survey respondents defined AL. • The most prevalent definitions described AL as "active vs. passive participation," or some form of "learning by doing," project-based learning, or "hands on" learning. Other global definitions cited the application of knowledge to practice or experiential learning. 67% of the faculty who answered this question defined AL in one of these 4 ways. • 27% described AL in terms of a shift in teacher and/or student roles, highlighting shared responsibility for learning, use of feedback loops, or student-focused instruction. • 25% described AL in terms of cognitive outcomes (intellectual engagement, problem solving, critical thinking, knowledge construction), 4% referenced affective outcomes (personal relevance or meaning, life long learning). • Definitions did not vary significantly across the subsystems.
2. How frequently were AL strategies being used by faculty at large? What did the average "teaching profile" look like?	• On average, faculty reported using 20 out of 42 listed strategies "somewhat" or "frequently." • "More Frequent" users reported an average of 26 strategies, "Less Frequent" users an average of 15. • Only 8 strategies were reported to occur more than "somewhat frequently." These strategies focused on student assessment, using "higher order" questions to guide discussion, live demonstrations inserted into lectures, small problem-solving groups, and hands on assignments. • Half the strategies were rarely or never used.
3. How did AL vary by subsystem, faculty course load, number of years teaching, and discipline?	• Although there were variations by subsystem on particular items, there were similarities on about ¾ of the strategies. • Professional / technical faculty used somewhat more AL, state university faculty used somewhat less, and community college faculty fell somewhere in the middle. • Use of AL did not vary by faculty course load. • Greatest use of AL was among mid-career faculty. • Science faculty used AL somewhat less, and humanities faculty used AL somewhat more than other faculty.
4. What were faculty members' attitudes towards AL?	• 70% said they were "very" or "somewhat satisfied" with AL strategies. They were most satisfied with lecture, discussion, and assessment; least satisfied with technology, experiential, and writing strategies. • There was generally strong endorsement on 4 of the 8 items describing perceived benefits and limitations of AL. • 71% considered themselves generally successful in getting students actively involved in learning. • 40% to 73% wanted to learn more about AL. Greatest interest was expressed for technology, least for writing.

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Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Faculty at Large	
Question	**Findings**
5. To what extent did the understanding of AL change over time?	• Although there were a few statistically significant shifts over time in the percent of faculty defining AL in terms of global and other types of definitions, changes were small. • The most prevalent definitions in 2000 were also the most prevalent in 2002.
6. To what extent did the teaching profile change over time?	Faculty Reported Use of AL (2000 vs. 2002) • Faculty reported use of AL in 2002 was very similar to the use reported by faculty in 2000. • Only one category of AL—technology—increased significantly, from a mean scale score of 2.32 in 2000, to 2.58 in 2002. *(4-point scale)* • At the item level, four technology strategies and one service learning strategy increased significantly over time. • No significant decreases in the use of AL were found. Student Observation of AL (2000, 2001, and 2002) • Observations of AL reported by students indicated no change over the 3 years studied. The use of AL neither decreased nor increased significantly over time.
7. Did faculty members' attitudes change over time?	• Responses of faculty respondents in 2000 and 2002 were remarkably similar for items related to satisfaction, beliefs about the strengths and limitations of AL, their ability to engage students, and interest in active learning. • The only meaningful change was in the increased level of participation in faculty development activities. • Participating in campus events rose from 42% in 2000, to 49% in 2002. • Fewer faculty in 2002 (36%) than in 2000 (44%) said they were "familiar with the system-wide CTL, but hadn't been involved since the merger in 1995." • Use of materials distributed by the system-wide CTL increased from 25% to 34%, and attendance in programs, events, and workshops increased from 23% to 29%.
8. Was participation in faculty development related to higher use of AL in 2002?	• There was a positive correlation between overall greater use of AL and greater participation in faculty development. The correlation was higher for campus events (r = .235) vs. system-wide events (r = .131). • The only category of AL that did not correspond to greater faculty development was interactive strategies. • Participation in faculty development at the campus level helped predict greater use of AL strategies, even after taking into account favorable attitudes towards AL, and other faculty characteristics such as course load and number of years teaching (R = .388). • Greater use of technology could *only* be predicted by greater participation in faculty development.

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Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Faculty Grantees	
Question	**Findings**
9. Did grantees define AL differently than faculty at large?	• Proportions of faculty responding for each of the categorical definitions were not tested for statistical significance, but on face value it seemed that grantees were less apt to provide simple, short, global definitions compared to faculty at large. • Grantees in 2001 were more likely to offer definitions that referenced the cognitive domain that grantees in 2002.
10. Did grantees use more AL compared to faculty at large?	Faculty Reported Use of AL (2001, 2002) • Grantees tended to have lighter teaching loads, and were significantly younger in their teaching careers. • Grantees reported using more discussion, technology, and collaborative learning techniques. • There was no difference in the reported use of lecture, writing, interactive, assessment, or experiential techniques. • When grantees were compared to the "More Frequent" and "Less Frequent" subgroups of faculty at large (rather than the average), grantees often fell into the middle range. Student Observation of AL (2001 and 2002) • Students in 2001 grantee classrooms observed greater use of only one of the 8 categories of AL: technology. • Students in 2002 grantees classrooms observed greater use of only 2 categories: interactive and collaborative learning.
11. Did grantees have more positive attitudes?	• Faculty at large and grantees were equally satisfied with AL. • Grantees held more positive views about AL. Sentiments were especially different on 4 statements concerning the perceived benefits and limitations of AL. • Grantees were more likely to disagree that AL "won't work if classes are small," is application for only certain subjects," and "won't work with my students." • Grantees were more likely to fee that AL "makes teaching more rewarding." • Grantees and faculty at large were equally confident about their ability to successfully engage students in learning.

Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Students in Classrooms Taught by Faculty at Large	
Question	**Findings**
12 (a). How satisfied were students with their courses? Did satisfaction change over time?	• 94% of the students in 2000 were "very" or "somewhat satisfied" with the teaching methods used in their courses. • Mean ratings for satisfaction were extremely similar all three years: 2000 = 3.51; 2001 = 3.49; 2002 = 3.49
12 (b). How involved with learning were students? Did the level of involvement change over time?	• 80% of the students in 2000 said they felt actively engaged with learning either "frequently" (44%), or "sometimes" (40%). • More than 70% said they reflected on what they were learning in the class, asked questions in class or contributed to classroom discussions, or received helpful feedback. • About 50% said they felt motivated by other students, worked harder than they though they could to meet the teacher's expectations, or worked on class assignments with other students outside of class. • 36% said they discussed ideas from their reading or class with the teacher outside of class • 30% said they rewrote a paper, or redid an assignment • 28% admitted coming to class unprepared, or feeling bored or sleeping during class. • About 1/5 of the students confessed to missing class on purpose or "by mistake." • Summary scale scores for positive involvement neither increased nor decreased significantly over the years. • Summary scale scores for disengagement neither increased nor decreased significantly over the years.
12 (c). How much time did students spend on the course? How many classes did they miss? Did these indices change over time?	• The amount of time students reported spending on the course in 2000 varied significantly, from zero hours per week (2.5%) to 8 hours or more (11.9%). • On average, students spent 3.84 hours per week reading, writing, doing research, studying, or meeting outside of class. • This average dropped to 3.61 in 2001, but rose to 3.80 in 2002. • About ¾ of the students said they missed "none, or very few classes" in the course during the semester. • The percentage of missed classes did not change over time.
12 (d). What were the responses concerning other positive outcomes of the course? Did these indices change over time?	• 87% of the students in 2000 said they learned a lot in the course. • 55% said they worked harder in this course, compared to others. • 11% confessed to having a generally negative attitude towards school • Between 55% to 70% of the students reported "best practices" of teaching. • Mean scale scores for positive and negative outcomes did not change over time

Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Students in Classrooms Taught by Faculty at Large	
Question	**Findings**
13 (a). To what extent did course satisfaction vary as a function of faculty members' use of AL?	• Course satisfaction did not vary as a result of AL. Students were equally satisfied in classrooms taught by faculty who used AL "More Frequently (MF)," and by those who used AL "Less Frequently (LF)."
(13 (b). To what extent did student engagement vary as a function of faculty members' use of AL?	First Year Results (2000) Students in MF classrooms reported higher involvement on 6 of the 9 items measuring positive involvement. • Ask questions or contribute to class discussion • Rewrite a paper, redo an assignment several times • Work harder than they thought they could to meet the teacher's expectations • Reflect on what they were learning in the course • Receive helpful feedback from the teacher • Feel actively engaged The magnitude of difference between MF and LF means ranges from .20 to .40, with the largest difference in writing. • Students in MF classrooms reported spending about half an hour more week studying for the course than in LF classrooms (4.10 vs. 3.60). • There were no differences on the remaining positive involvement or disengagement items. Results in Years Two and Three (2001, 2002) • These first-year results for positive involvement were not replicated in subsequent years. • Very small increments suggesting regression to the mean were found for positive involvement and disengagement in both 2001 and 2002. • Follow-up analyses suggested that significant attrition in the sample (nearly 50%), and the loss of the ***most*** and ***least*** frequent users of AL, explained this pattern. • While the mean number of hours spent studying for the course dropped in MF classrooms from 4.1 in 2000 to 3.49 in 2001, it rose to 3.94 in 2002. Follow-up analyses suggested no difference between MF and LF groups, only natural fluctuation in sampling due to attrition.

Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Students in Classrooms Taught by Faculty at Large	
Question	**Findings**
14 (a). What factors were associated with positive student involvement?	Analysis Conducted in Year One (2000) • Students' age was significantly and positively correlated with virtually every item. The highest correlations (r = .31) occurred with "time spent out of class studying." • After age, the second most important correlate was curriculum area. Significant differences were found on 11 of the 19 items studied. Students in art and professional / technical courses were more likely to report positive involvement, time spent out of class, and positive outcomes than students in humanities or science courses. • Smaller class size was positively correlated with several items measuring involvement, and also with time spent out of class. • Gender (male) was associated with 4 items related to disengagement. • Number of years faculty had been teaching was positively correlated with the likelihood of students asking questions or contributing to class discussions.
14 (b). After controlling for other factors, did faculty members' use of AL predict positive indices of student engagement?	• Enrollment in a MF classroom was found to contribute significantly to the prediction of six indices of student involvement, after controlling for student age, gender, English as first language, number of years teaching, and class size. • The strongest model was found for the dependent variables, "feel actively engaged." In this analysis, age and class size were the first two independent variables entered. Adding the variable for active learning classroom (MR vs. LF) increased the multiple correlation to R = .261 (p = .033). Together, these three variables account for about seven percent of the variance in "feel actively engaged."

Answers to Fifteen Guiding Evaluation Questions

Effects of the LBD on Students in Classrooms Taught by Faculty Grantees	
Question	**Findings**
15 (a). Was course satisfaction higher in grantee classrooms compared to classrooms taught by faculty at large?	• Satisfaction was lower in classrooms taught by grantees in 2001, compared to faculty at large (mean 3.25 vs. 3.49) • There was no difference in student satisfaction between students in 2002 grantee classrooms compared to faculty at large.
15 (b). Were indices of student involvement higher in grantee classrooms, compared to classrooms taught by faculty at large?	Grantee Classrooms in 2001 Students in grantee classrooms were significantly *more* likely to: • Rewrite a paper, redo an assignment several times • Work on class assignments outside of class • Discuss ideas with the teacher outside of class • Work harder than they thought they could to meet the teacher's expectations • Feel motivated by other students • Work harder in this course compared to most others • Spent more time outside of class studying (4.62 vs. 3.61 hours per week) Students in grantee classrooms were significantly *less* likely to: • Feel bored or sleep during class • Miss class on purpose or "by mistake" Grantee Classrooms in 2002 Students in grantee classrooms were significantly *more* likely to: • Work on class assignments outside of class • Discuss ideas with the teacher outside of class • Feel motivated by other students • Not understand what the goal of the course was, or what they were supposed to learn • Report that the teacher frequently asked them to reflect on what they were learning, and getting out of the course

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